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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/575,271

04/11/2006

Kenji Kitamura

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03/25/2008

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EXAMINER

PETKOVSEK, DANIEL

ART UNIT

PAPER NUMBER

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MAIL DATE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/575,271	Applicant(s) KITAMURA ET AL.	
	Examiner Daniel Petkovsek	Art Unit 2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on election filed February 1, 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 11-14 and 23-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5, 6, 8-10, and 15-22 is/are rejected.
- 7) ☒ Claim(s) 4 and 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on April 11, 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/11/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is in response to the election filed February 1, 2008.

Claims 1-26 are pending.

Election/Restrictions

1. Applicant's election without traverse of group I, claims 1-10 and 15-22 in the reply filed on February 1, 2008 is acknowledged.
2. Claims 11-14 and 23-26 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected group, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on February 1, 2008.

Information Disclosure Statement

3. The prior art documents submitted by Applicant in the Information Disclosure Statements filed on April 11, 2006, have been considered and made of record (note attached copy of forms PTO-1449). It is noted that the **four NPL references from the IDS were not considered**, since a copy of each reference has not been received. Any NPL reference must be supplied to the PTO, and it is appreciated if a copy of each reference is provided in response to this office action.

Priority

4. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 10 and 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Independent claims 1 and 15 function as a method when the electrodes and the control layers are present. Removing these layers would destroy the functionality of claims 1 and 15. It is recommended that Applicant cancel these claims, since they do not particularly point out and distinctly claims the subject matter in view of the independent claim they depend from.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-3, 6, 9, 15-17, 19, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Mizuuchi et al. U.S.P. No. 6,353,495 B1.

Mizuuchi et al. U.S.P. No. 6,353,495 B1 teaches (ABS; Figs. 8-10; column 8, line 52 through column 9, line 50; column 10, line 45 through column 11, line 41) a method of forming a domain inverted region in a ferroelectric single crystal, said method comprising: a step of forming a control layer 51/61/62 having a larger defect density than the defect density of the ferroelectric single crystal 1 on

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a first face perpendicular to the direction of polarization of said ferroelectric single crystal in said ferroelectric single crystal, a step of forming a first electrode 53/64 on said control layer 51/61/62, a step of forming a second electrode 52/63 having a smaller area than the area of said first electrode on a second face being opposite (see Figs. 8-10) to said first face of said ferroelectric single crystal, and a step of applying an electric field between the first and second electrodes in which the spontaneous polarization possessed by a domain inverted region generated from said second electrode is inherently terminated through said control layer at said first electrode side, which clearly, fully meets Applicant's *claimed method* limitations.

Regarding independent method claim 15, the control layer 51/62/63 of Mizuuchi et al. '495 has a lower degree of order of lattice points than the degree of order of lattice points of the ferroelectric single crystal 1.

Regarding claims 2 and 16, the crystal is substantially either lithium niobate or lithium tantalate (column 1, lines 16-24).

Regarding claims 3 and 17 the ferroelectric crystal can comprise the claimed elements at low mol% (column 6, lines 11-15).

Regarding claims 6 and 19, a further control layer exists (Fig. 10; layers 62 and 63).

Regarding claims 9 and 21, the electrodes can be both periodic and flat.

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9. Claims 1, 2, 5, 15, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Mizuuchi et al. U.S.P. No. 6,002,515.

Mizuuchi et al. U.S.P. No. 6,002,515 teaches (ABS; Figs. 9(a)-(d); column 19, line 18 through column 20, line 2) a method of forming a domain inverted region in a ferroelectric single crystal, said method comprising: a step of forming a control layer 14 having a larger defect density than the defect density of the ferroelectric single crystal on a first face perpendicular to the direction of polarization of said ferroelectric single crystal in said ferroelectric single crystal, a step of forming a first electrode 15 on said control layer, a step of forming a second electrode 13 having a smaller area than the area of said first electrode on a second face being opposite (see Fig. 9d) to said first face of said ferroelectric single crystal, and a step of applying an electric field between the first and second electrodes in which the spontaneous polarization possessed by a domain inverted region generated from said second electrode is inherently terminated through said control layer at said first electrode side, which clearly, fully meets Applicant's *claimed method* limitations.

Regarding independent method claim 15, the control layer 14 of Mizuuchi et al. '515 has a lower degree of order of lattice points than the degree of order of lattice points of the ferroelectric single crystal.

Regarding claims 2 and 16, the crystal is substantially either lithium niobate or lithium tantalate (column 1, lines 16-24).

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Regarding claim 5, the step of annealing occurs during the formation of the domain inverted region of Mizuuchi et al. '515.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 8, 18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuuchi et al. U.S.P. No. 6,353,495 B1.

Mizuuchi et al. U.S.P. No. 6,353,495 B1 teaches (ABS; Figs. 8-10; column 8, line 52 through column 9, line 50; column 10, line 45 through column 11, line 41) a method of forming a domain inverted region in a ferroelectric single crystal, said method comprising: a step of forming a control layer 51/61/62 having a larger defect density than the defect density of the ferroelectric single crystal 1 on a first face perpendicular to the direction of polarization of said ferroelectric single crystal in said ferroelectric single crystal, a step of forming a first electrode 53/64 on said control layer 51/61/62, a step of forming a second electrode 52/63 having a smaller area than the area of said first electrode on a second face being opposite (see Figs. 8-10) to said first face of said ferroelectric single crystal, and a step of applying an electric field between the first and second electrodes in which the spontaneous polarization possessed by a domain inverted region

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generated from said second electrode is inherently terminated through said control layer at said first electrode side.

Mizuuchi et al. '495 does not disclose **expressly** the particulars of the claims 18 or 20, in which the control layer includes an additional step of ion implantation during the formation of the layer (even though these elements are present in the control layer of Mizuuchi et al. '495), or using annealing steps during formation of the control layer (claim 8). At the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to use ion implantation to implant the elements in the control layer, or to use an annealing step for the control layer because Applicant has not disclosed that using ion implantation to implant the elements in the control layer, or using an annealing step for the control layer provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Mizuuchi et al. '495 to perform equally well with using ion implantation to implant the elements in the control layer, or using an annealing step for the control layer because these claim terms would be easily implemented as method steps and also ion implantation is a well known form of getting elements into optical structural substrates or crystals and also is an efficient mode to add these ions to the structure (further annealing is known to make elements stronger and more durable to outside forces). Therefore, it would have been an obvious matter of design choice to modify Mizuuchi et al. '495 to obtain the invention as specified in claims 8, 18, and 20. See *KSR v. Teleflex*, 127 S.Ct. 1727 (2007).

Allowable Subject Matter

12. Claims 4 and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The closest prior art of record does not teach or reasonably suggest, in combination, a specific method of forming a domain inverted region in which the further steps of *depositing a metal layer and annealing the metal layer* as the formation of the control layer.

Inventorship

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: PTO-892 form references A-E.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Petkovsek whose telephone number is (571)272-4174. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel J Petkovsek/
Daniel Petkovsek
Examiner, Art Unit 2874
March 9, 2008

/Sung H. Pak/
Primary Examiner, Art Unit 2874